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Short Report

Presence of antibodies to *Hantavirus* in rat and human populations of Djibouti

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The diagnosis of human haemorrhagic fever with renal syndrome (HFRS) has not been recorded in the Horn of Africa. Since the identification of a virus as agent of HFRS (LEE *et al.*, 1978), several serotypes of this virus have been described as members of a new genus of viruses, *Hantavirus*, within the family Bunyaviridae (LEDUC *et al.*, 1986). Several human cases of HFRS have been reported in Central Africa (COULAUD *et al.*, 1987).

To assess the potential threat of human disease from *Hantavirus* infection in the Horn of Africa, rats were captured and studied in the city of Djibouti during October 1991. Rodents and other small mammals were live-trapped indoors and outdoors from several regions of the city, anaesthetized, and specifically identified. Sera from blood collected by cardiac puncture were preserved by freezing at -80°C and then tested at US Naval Medical Research Unit No.3 (NAMRU-3) by immunofluorescent antibody (IFA) assay.

Antigen spot slides prepared from E-6 Vero cells infected with the Hantaan serotype of Korean haemorrhagic fever (KHF) virus were used for testing sera for Hantaan antibody. Sera were diluted 1:10, 1:20, 1:40 and 1:80 in phosphate-buffered saline; then, for each dilution, one drop was placed on the ringed antigen area of the slides. Slides were incubated at 37°C for 30 min, then rinsed in distilled water and dried. Affinity-purified anti-species immunoglobulin G (Ig G) conjugated with fluorescein isothiocyanate (K & P Laboratories, Rockville, Maryland, USA) was diluted at 1:30 and a drop was placed on each of the ringed antigen areas. Slides were incubated at 37°C in a moist chamber for another 30 min, washed as before, mounted with buffered glycerol (pH 8·6) and examined with a fluorescence microscope at 400–600 magnification. For a sample diluted 1:40, bright apple green colour associated with antigen cells was considered to indicate antibody positivity. Positive and negative control sera were included with each test.

One hundred and seventy-three small mammals were captured, with 57·8% from the port area and *R. norvegicus* the primary species (78·5%). The overall *Hantavirus* positivity rate was 5·2%. All 49 *Rattus rattus*, 9 *Crocidura somalica* (shrews), and 7 *Mus musculus* sera were negative for *Hantavirus* antibodies. Only 9 of the 108 *R. norvegicus* sera were positive for antibodies to *Hantavirus* (prevalence 8·3%) (Table). All *Hantavirus* reactive sera (from 1:10 to 1:80 dilution) were from *R. norvegicus* caught in the port area. There was no statistically significant association between Hantaan positivity and sex, age (adult or young), or indoor or outdoor collection.

Table. Sera reactive by immunofluorescence for antibodies against *Hantavirus* in rodent and human sera

Serum	No.	Highest dilution for reactivity* 1:10	1:20	1:40	1:80
R. norvegicus	108	6	3	2	7
Other rodents	65	0	–	–	–
Djiboutian army	198	20	7	3	4
Djiboutian navy	14	2	0	–	–

*Positive test requires reactivity at a dilution ≥1:40

In order to assess the prevalence of *Hantavirus* infection in the human population of Djibouti, 212 human sera were tested. These sera had been collected in May 1991 from Djiboutian military personnel enrolled by consecutive sampling, without selection criteria, at the local military clinic during a human immunodeficiency virus survey. The mean age was 33·2 years (range 20–54 years). Thirty-six of 212 human sera (16%) were reactive for IgG to *Hantavirus* at 1:10 dilution, but only 7 (3·3%) were considered positive (reactive at dilutions ≥1:40). There was no statistically significant association between location of work or residence and antibodies to *Hantavirus*. In particular, naval personnel working frequently in the port area did not show a higher prevalence of *Hantavirus* infection (Table).

The association between rat seropositivity and the port area contrasts with the absence of correlation among the indigenous human population. This underlines the difficulty in estimating the epidemiology of *Hantavirus* infection. A definite association between *R. norvegicus* and Seoul virus, a *Hantavirus* member known to cause moderate to severe disease in human, has been previously described (CHILDS *et al.*, 1987).

The absence of reports of human cases of HFRS in Djibouti suggests either the predominance of asymptomatic infections or that symptoms of infection such as mild febrile illness are misdiagnosed as common febrile diseases such as malaria. Another hypothesis is the presence of a non-pathogenic Hantaan-related virus, as already suggested elsewhere in Africa (GONZALES *et al.*, 1984, 1989), that is possibly not related with the virus in the rat population.

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